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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/615,881	07/10/2003	Jae-Hyun Yeo	9862-000015/US/CPA	8462

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EXAMINER

NGUYEN, TUAN H

ART UNIT	PAPER NUMBER
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2813

DATE MAILED: 08/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/615,881	YEO ET AL.	
	Examiner	Art Unit	
	Tuan H. Nguyen	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 June 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 and 25-29 is/are pending in the application.
- 4a) Of the above claim(s) 1-18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 19-23 and 25-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 19, 20, 23, 25, 26, 29 are rejected under 35 U.S.C. 102(e) as being anticipated by Raaijmakers et al..

See Raaijmaker et al., particularly figs. 5-10 and related text which discloses the claimed method for forming a capacitor including the steps of forming metal oxide dielectric 302 over a first electrode 300, 304 (fig. 7) by exposing the first electrode to a first alkoxide (col. 12, third paragraph from the bottom for the alkoxide material); chemisorbing a first portion of the first alkoxide onto the first electrode to form a first alkoxide layer (paragraph bridging col. 12-13); exposing the first alkoxide layer to

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plasma N₂O (col. 13, third paragraph, lines 38-39); chemically reacting the first alkoxide layer and a portion of the plasma N₂O to form a dielectric layer of the first electrode (col. 13 lines 50 to col. 14, line 35); forming a second electrode 308 on the dielectric layer 302 (fig. 10).

With respect to claim 20, see col. 6, next to last paragraph.

With respect to claim 23, see fig. 5 and col. 12, third paragraph.

With respect to claim 25, see paragraph bridging col. 14-15.

With respect to claim 26, see col. 14, second and third paragraph.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 20-22, 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Raaijmakers et al. in view of Callegari et al. (cited ref.).

Raaijmakers et al., figs. 5-10 and related text which discloses the claimed method for forming a capacitor as explained above, except the dielectric layer other than Al₂O₃, ZrO₂, Ta₂O₅, TiO₂, as claimed in claim 20, or hafnium alkoxide as claimed in claims 21-22, or first and second alkoxide of different materials as claimed in claims 27-28.

Callegari et al., in a related method of film deposition, and fabrication of structures, including the formation of capacitor as shown in figs. 23-28 and related text

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in Examples 3, 8, 9 on col. 10, 13-16, teaches the formation of a dielectric material 34 by ALD comprising a multilayer structure with aluminum oxide and other metal oxide including HfO_2 (col. 14, lines 20-37. See also col. 11, lines 51-54). Note also in Raaijmakers et al., col. 19, lines 54-57 for the suggestion of forming a multiple element dielectric layer.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used hafnium alkoxide and aluminum alkoxide or other well-known dielectric materials for forming a dielectric layer as suggested by Callegari et al. in Raaijmakers et al. process since the combination of different materials would improve in dielectric constant, higher capacitance, and reduce in leakage current.

Response to Arguments

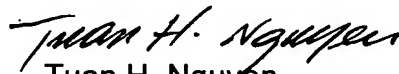
Applicant's arguments with respect to claims 19-23, 25-29 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan H. Nguyen whose telephone number is 571-272-1694. The examiner can normally be reached on 9AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Tuan H. Nguyen
Primary Examiner
Art Unit 2813

TN